IUE Data Analysis Software for Personal Computers
Final Report for Contract NAS5-32629

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11 April 1996

Abstract

This report summarizes the work performed for the program titled "International Ultraviolet Explorer (IUE) Data Analysis Software for Personal Computers" awarded under Astrophysics Data Program NRA 92-OSSA-15. The work performed was completed over a two-year period starting in April, 1994. As a result of the project, 450 IDL routines and eight database tables are now available for distribution for Power Macintosh computers, and Personal Computers running Windows 3.1.

1 Introduction

The International Ultraviolet Explorer (IUE) Data Analysis software is written in the Interactive Data Language (IDL) marketed by Research Systems Incorporated (RSI). In the past it has been supported by the IUE project on VMS, Unix, and Ultrix platforms. The software allows users to reduce and analyze IUE spectral data, display images, perform various database searches and convert data sets into various file formats. Although designed primarily to reduce and analyze IUE spectral files, it has also been used to analyze both HST and Copernicus data. The software is maintained by the IUE Data Analysis Center (IUEDAC) and is distributed free of charge via anonymous ftp.

The current IUEDAC software library consists of 450 individual programs, containing roughly 35,000 lines of executable code and $\sim$ 40,000 lines of documentation. In addition, several databases are maintained including the recently expanded IUE merged observing log, the IUE FES table, the bibliographic reference database (which catalogs papers published using IUE data), and a table of IUESIPS configuration entries.

Since the time the ADP proposal was submitted, the IUEDAC undertook several software development projects. With the release of the first NEWSIPS data, the IUEDAC upgraded their software to allow the extraction and analysis of low dispersion NEWSIPS processed data. Much of the software needed to support high dispersion NEWSIPS data is also available. General support for Flexible Image Transport System (FITS) file format was also completed. IDL routines can now read primary array FITS files as well as Image, Table, and Binary table extensions. In addition

programs tend to run slower than the corresponding system commands, the IUEDAC programs only execute these routines if the system calls are not allowed.

3 Hardware and Software Restrictions

Several bugs have been discovered in the various releases of IDL for Macs and IDL for Windows. (A list of these problems is stored in a separate document described below.) For the purpose of this project, our software conversion is based on IDL version 4.0.1. Users with earlier versions are urged to upgrade before running our software. Unfortunately, several bugs (in our opinion) still exist in the latest release of IDL which significantly impact the operation of some IUEDAC routines. Hopefully, RSI will continue to improve IDL in the future and the existing problems will be corrected.

Our Macintosh conversion was based on a PowerMac model 7100/66. Any of the PowerMac series computers should be adequate. Earlier models may also be compatible although running IDL requires a math coprocessor and execution times may be slower. The PC conversion was performed on a pentium-based Compac Deskpro XL 560 running Microsoft Windows release 3.11 and the Win32s 32-bit subsystem version 1.25. As with Macintosh computers, earlier models may be compatible but execution times will be slower. Further information on compatibility can be obtained from RSI.

Note that we have not tested our software under Windows 95, Windows NT, or the Linux operating system. If there is sufficient interest in these other platforms a follow-up ADP proposal could be submitted to support these systems as well.

Several minor hardware differences were also found among personal computers supporting Microsoft windows. For example, some PCs include a 3-button mouse while others have a 2-button mouse. The latest version of IDL supposedly allows a 2-button mouse to emulate a 3-button mouse although this capability may vary with the mouse driver being used.

3.1 Requesting Archive Data

Because of problems submitting mail from within an IDL session, and because most PCs do not leave FTP servers active, we did not find an easy way to modify the IUE archive request routine IUEFX to submit and receive archive data from NSSDC, as is currently possible from VMS and Unix systems. As an alternative, IUEFX was modified so that data requested by Mac and PC users is automatically written to the NDADS staging area. The user can then ftp the files to his computer.
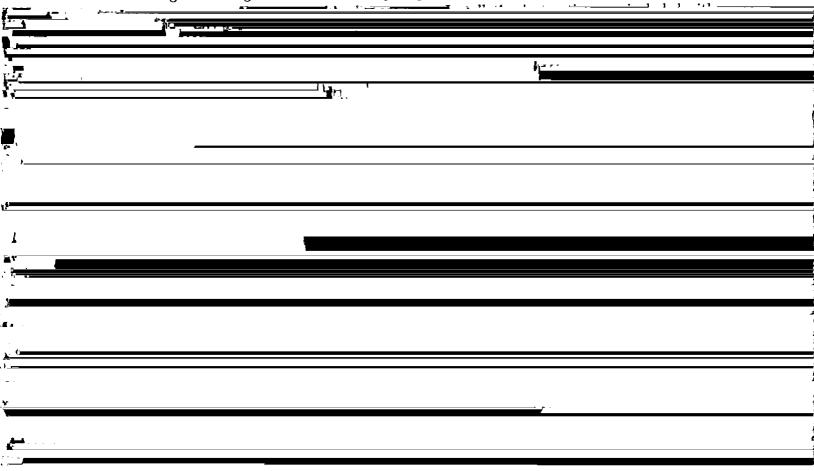
4 Support and Distribution

The MAC and PC software, database files, and the documentation described below, were officially delivered to the IUEDAC where it is expected to be supported at the same level as the software for other platforms. The availability of the new software will be advertised in the IUEDAC electronic

newsletter. It has also been described in a general poster paper presented at the recent San Antonio AAS meeting titled, " The International Ultraviolet Explorer Data Analysis Center".

Although the MAC and PC software was distributed for beta testing, there was little if any feedback from the users. Although testing was performed by the developers, it is doubtful that every module was exercised and therefore some errors may still exist. It is expected that problems reported to the IUEDAC staff will be corrected as soon as possible.

To simplify distribution, the Mac and PC procedure libraries are stored in compressed, self-extracting files located in an anonymous ftp account (along with the other IUEDAC software) on the node IUEWWW. No other programs are needed to extract the software. The Mac software is stored in a self-extracting archive file in ASCII format created using Compact Pro. The files are extracted by double-clicking on the archive file. This will also recreate the IUEDAC directory structure within the user-specified folder. The database files are stored in separate files using a similar format. The PC software is stored in self-extracting Zip files (created using WinZip) which can be unzipped by either double-clicking on the file from the File Manager, or clicking on Run from the Program Manager. The user will be prompted for the directory name in which to unzip

both sets of files.

5 Documentation

The following documents have been prepared to assist users in installing and executing the Mac and PC versions of the IUEDAC software. Documentation on individual routines is stored within the prolog of the individual routine and can be displayed using a routine called Prolog. In general the IUEDAC Users Guide, which describes the majority of IUEDAC programs, applies equally to all platforms. A future version however will add comments about program-specific differences between

6 Conclusion

The IUEDAC software is now available for Macs and PCs running Windows 3.1. The software and several optional database files are available free of charge via the anonymous ftp account on iuewww.gsfc.nasa.gov. All files are self-extracting and do not require any additional software other than IDL to run, except possibly for software to allow local printing of postscript files. It is expected that this software will be supported in the future by the IUEDAC.

Users familiar with VMS and Unix IDL may require some time getting use to the PC and Mac environments. In general, we found the Mac and PC versions of IDL to be contain more bugs than versions running on other platforms, although we expect these will be fixed in future releases of IDL from RSI. In any event, we find that the speed of the PowerMacs and Pentium PCs allow IUEDAC routines to run as fast if not faster than many of the current workstations, and in many cases, at a fraction of the cost.